

Attorney's Docket: 2002DE444
Serial No.: 10/735,490
Art Unit 1714
Response to Office Action, Dated 07/02/2007

Remarks

The Office Action mailed July 2, 2007 has been carefully considered together with each of the references cited therein. The amendments and remarks presented herein are believed to be fully responsive to the Office Action. Accordingly, reconsideration of the present Application in view of the following remarks is respectfully requested.

Applicant has amended the claims to more clearly recite what Applicant believes to be the invention. In claim 1 and in claim 19, Applicant added the requirement that the comonomer b) is tertiary-branched. Support for the amendments to claims 1 and 19 may be found in originally filed claims 1, and 9, in paragraph [00020], line 5, and Applicant's examples as discussed hereinbelow. It is believed that no new matter has been introduced by these amendments.

Claims 1 and 19 and their dependencies were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The rejection of claims 1 and 19, under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement should be withdrawn in view of the above amendments which as discussed herein above have support in the written description. The rejection of dependent claims 2-17 and 19-30 under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement should be withdrawn for the reasons given in support of claims 1 and 19 from which they depend.

In Applicant's Examples shown in Table 1b), reproduced hereinbelow, examples P1 to P10 have a tertiary branched monomer, vinyl neodecanoate (VeoVa 10). The comparative tests are shown as P12 to P16 and P11 which do not have a tertiary branched comonomer within the claimed molar composition range.

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(Portions of Table 2) **Table 2: Parameters of the test oils**

		Test oil 1	Test oil 2	Test oil 3	Test oil 4 (comp.)
Cloud Point	[°C]	-9.8	-22.2	-10.0	-9.3
CFPP	[°C]	-14	-27	-11	-14
Paraffin 10° below CP (DSC)		4.2%	3.6%	4.5%	2.7%
Density 15°C	[g/cm³]	0.828	0.831	0.828	0.842
Sulfur content		8	26	9	420
Aromatic content	[% by wt.]	14.3	18.3	16.7	24.6
of which					
mono	[% by wt.]	12.6	15.7	15.1	20.6
di	[% by wt.]	1.5	2.2	1.2	3.4
poly	[% by wt.]	0.2	0.3	0.4	0.6

Table 1b: Characterization of the terpolymers

Example No.	Vinyl acetate	Branched monomer	Σ comonomers		V_{140}
	[mol%]	[mol%]	[mol%]	[% by wt.]	
P1	4.80	7.60(VeoVa 10)	12.40	44.00	147
P2	4.60	8.00(VeoVa 10)	12.60	44.80	194
P3	4.70	7.70(VeoVa 10)	12.40	43.90	63
P4	4.70	8.30(VeoVa 10)	13.00	45.70	171
P5	5.70	7.80(VeoVa 10)	13.50	45.70	166
P6	4.50	9.30(VeoVa 10)	13.80	48.10	167
P7	7.00	7.90(VeoVa 10)	14.90	47.70	167
P8	7.40	7.80(VeoVa 10)	15.20	47.80	186
P9	10.80	5.10(VeoVa 10)	15.90	46.20	128
P10	11.20	4.60(VeoVa 10)	15.80	44.20	142
P11	7.20	7.30(EHV)	14.50	43.80	132
P12 (comp.)	8.70	1.60(EHV)	10.30	28.80	168
P13 (comp.)	2.90	7.00(EHV)	9.90	30.00	218
P14 (comp.)	13.70	1.40(VeoVa 10)	15.10	37.80	97
P15 (comp.)	13.30	0.00	13.30	32.00	140
P16 (comp.)	0.00	7.50(VeoVa 10)	7.50	36.40	176

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Applicant's invention is directed to providing additives and methods for improving the cold flow properties of middle distillates which have a low sulfur content and a low aromatics content, when the blending of the additive and the oil take place at low blending temperatures. Applicant surprisingly discovered that the additives which achieved the objectives of the invention comprised a copolymer of ethylene, and comonomers of formula (b) having tertiary-branched vinyl esters, and comonomers of formula (c) such as vinyl acetate with the specified contents of comonomers (b) and (c). Tables 3 – 6 show the effectiveness of the additives of the present invention in terms of improved filterability (Table 3) and improved Cold Filter Plugging Point (CFPP) response (Tables 4-6) in Test Oils 1, 2 and 3. Additives not having a comonomer b) with a tertiary branched radical failed to achieve this effectiveness. In Table 3, when the comonomer b) included a tertiary-branched radical, the filterability times shown for the additives P1 through P10 of the invention as claimed showed significantly lower filterability times than the comparative examples 12-16 in Test Oil 1. In Table 5, when the comonomer included the tertiary-branched radical as in the compounds P1 through P10, the cold filter plugging point, CFPP, showed significantly lower values, for example at 1000 ppm than the same dose in Test Oil 2 for the comparative compounds of P13-P16 or P11 wherein these compounds did not have a comonomer b) with a tertiary-branched radical.

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Table 5: CFPP effectiveness in test oil 2

Example No.	Terpolymer	350 ppm	700 ppm	1000 ppm
37	P1	-30	-32	-38
38	P2	-29	-32	-37
39	P3	-29	-34	-35
40	P4	-30	-32	-37
41	P5	-28	-37	-40
42	P6	-30	-34	-39
43	P7	-31	-38	-38
44	P8	-29	-40	-42
45	P9	-30	-35	-38
46	P10	-30	-34	-36
47	P11	-28	-31	-32
48 (comp.)	P13	-23	-26	-28
49 (comp.)	P14	-22	-23	-22
50 (comp.)	P15	-22	-23	-26
51 (comp.)	P16	-22	-22	-23

As shown in table 5, in all of the inventive compounds P1-P10, there was at least a 3 degrees C better CFPP improvement than the compounds of the comparison experiments P13-P16 and P11 which did not have a comonomer b) with a tertiary-branched radical. No one skilled in the art could have been able to predict these superior results for the inventive additive.

It is respectfully submitted that, in view of the above remarks, the rejections under 35 U.S.C. §112 should be withdrawn and that this application is in a condition for an allowance of all pending claims. Accordingly, favorable reconsideration and an allowance of all pending claims are courteously solicited.

Respectfully submitted,



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